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VOL. XIV

MARCH, 1908

No. 6

The Agricultural Student

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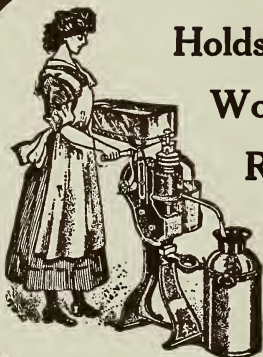


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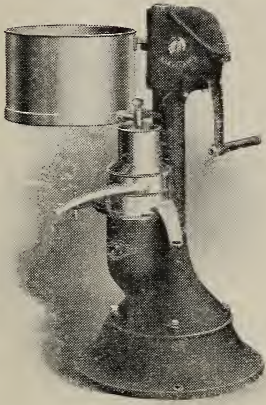
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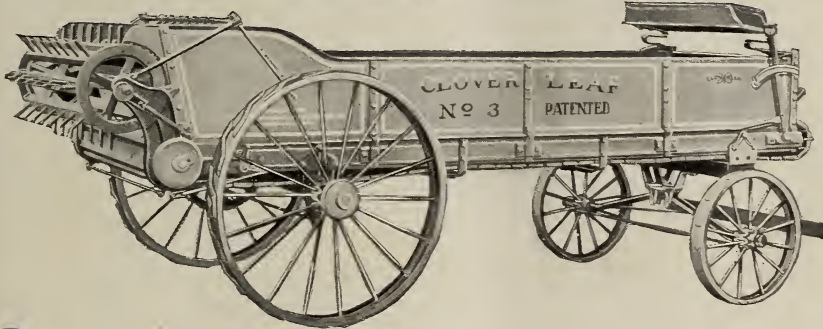
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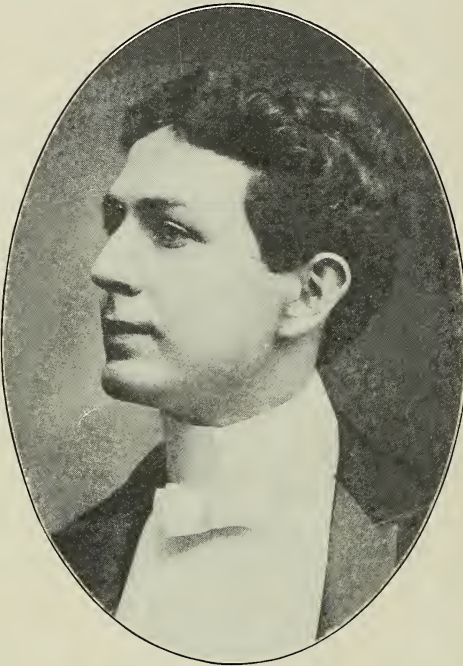
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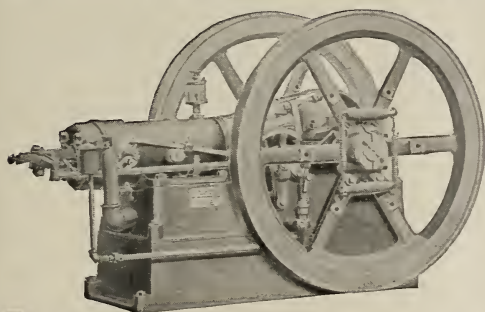
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The east wind blows free in the morning's prime;
Yet cheerful and gay the bird chirps his lay—
"Hearts make his own May, and its pairing time."

THE AGRICULTURAL STUDENT.

VOL. XIV

OHIO STATE UNIVERSITY, COLUMBUS, MARCH, 1908

No. 6

The New Agricultural Buildings Are Dedicated.

THE DEDICATORY ADDRESS.

The new agricultural buildings were formally dedicated February 12 in the University chapel. A large crowd was present to listen to the speeches, and, as the Ohio Dairymen and Ohio Live Stock Breeders were in session at the University on that day, representative farmers from all over the state were among the audience. This enabled these men to see what progress our college is making in the way of equipment, and their presence was something to be desired.

President Thompson presided and in his introductory remarks traced the history of our Agricultural College. He pointed out the fact that ten years ago the erection of Townshend Hall placed the college in the front ranks among agricultural colleges, and the completion of the new stock buildings would enable her to keep this desired place.

Governor Harris, the next speaker, traced the history of the agricultural college in the United States from the time of its birth in 1861 to the present days. He paid especial tribute to the work of Senator Justin S. Morrill, of Vermont, to whose repeated efforts the passage of a bill in Congress in 1861, providing for an agricultural college in each state, was due. This bill pro-

vided that each state should receive a grant of 30,000 acres of public land for each Senator and Representative she had in Congress. Under this act Ohio received 630,000 acres, but a lack of foresight prevented the land being held until valuable. The receipts from its sale, \$141,000, were made a part of the state's irreducible debt.

Governor Harris said that the members of the Legislature have the interests of the Agricultural College at heart and predicted ample support for it as it expanded.

Hon. O. E. Bradfute spoke for the Board of Trustees of the University, and in a humorous way explained the position of this board between the people on one side, and the Legislature on the other. Speaking for the board, Mr. Bradfute invited inspection of the new buildings after the exercises were over and for the people to determine for themselves whether or not the money had been wisely expended. It is needless to say this invitation was widely accepted.

The principal speech of the day, the dedicatory address, was delivered by Professor Thomas F. Hunt, Dean of the Pennsylvania State Agricultural College and director of the Pennsylvania Agricultural Experiment Sta-

tion. As Professor Hunt is so well known in Ohio, having been Dean of our own college, his address was of especial interest to his many friends. In substance, his speech was as follows:

"A man may go into new places, amid new scenes, and make new friends, but, after all, there is no place like the old place and no friends like the old friends. So with me there is no state that holds as much interest for me as Ohio, no city as Columbus, and no friends that are as much to me as the old friends at Ohio State University. I am glad to be with you on this important occasion, to meet these old friends, and also to see the great progress Ohio State University has made in the last five years, as evidenced in the many fine new buildings which have been erected. I am reminded of a story here about two men who were having a conversation about ghosts in graveyards. One man said he did not believe in them. The other told him he was afraid to go there at night. In a spirit of bravery the fellow agreed to go on that night. Shortly after arriving the ghost appeared, and Pat started to run. Uphill and downhill, across meadows and woods, he went, but the ghost kept right at his side. At last Pat sat down on a log to get his breath, and the ghost sat down beside him. Finally Pat looked at the ghost and observed, 'We've been going some.' 'Yes,' replied the ghost. 'And, bedad, sor, as soon as I get me breath we'll be after going some more,' said Pat. Ohio State has been 'going some,' and as soon as the Legislature gets its breath she will go some more.

"Not very far from Columbus is a great enclosure built by the Indian ancestors. This great work must have required a tremendous amount of labor

and time, as it was all done by hand labor. No beasts of burden were used and even with our improved machinery of the present day such a task would represent a great amount of labor. It is estimated that when America was discovered that the population was all that the country would support in the manner the Indians lived. There were no domestic animals in use in tilling the soil or as beasts of burden of any kind. Domestic animals are a prime requisite to civilization. The number of domestic animals measures the development of man. It is easily illustrated in the following wage problem: In South Carolina one man works one mule to a plow and receives \$10 per month. In Oregon one man works nine horses to a gang plow and receives \$40 per month. Yet the South Carolina man receives higher wages according to the work accomplished. One day in going through Illinois I noted the number of horses used on one implement. There were twelve two-horse teams, eighteen working three horses each and four using four horses. A New York farmer uses two 1000-pound horses, an Illinois man three 1500-pound horses. The difference in the amount of work done by one man measures the difference in the price of farm land in Illinois and New York.

"Among the students at Pennsylvania College is a man from India. In talking to him one day I said, 'What do you think about domestic animals and labor-saving machinery in India?' 'We have no place for them,' he replied. 'Labor is too cheap.' 'Right there,' I replied, 'is the reason for your cheap labor.' Cities are possible only where domestic animals and labor-saving machinery are used, and where there are no cities labor is cheap.' If

we had to harvest grain now as of old, it would require all the men of military age in the country to harvest the crops.

"In old times merchandise was largely transported on the backs of horses and mules. The use of animals as motive power has largely declined and will decline more; yet, in spite of all this, the number of horses in use increased instead of decreased, and yet a much larger proportion of the people lived in the cities. This is due to the fact that the wants of man increase in proportion to his abilities and resources. Better facilities not only cause more people to travel, but people to travel more often. The great advance of wealth of these times is due largely to the use of fuel in the world's work. However, such power will not supplant animal power, but work with it. By furnishing clothing, animals have enabled man to enlarge his habitat. In the early history of the world men lived only in the warmer portions of the earth, where little food and shelter were required. Ancient Babylon and Egypt was thus naturally the seat of the birth of the human race. Especially in the case of leather man has an animal product that has enabled him to plant his foot in the wilderness or upon the mountain side.

"In the United States in 1900 only 12 per cent. of the land was in any other crop than grass. The rest was in grass and woods. Of this 12 per cent., 10 per cent. was in cereal grain, of which product a large part was fed to animals; for instance, 80 per cent. of the corn crop.

"Domestic animals have added to our refinement of diet and increased the stability of the world's food supply. No nation which has a considerable part of its food supply in live stock will suffer from a famine, for

they act as storehouses. When I said this, the man from India sat up and took notice.

"Whether animals are kept as pets or slaves, they compel habits of care and responsibility. They have an elevating influence and tend to remove from man much of his inherent brutality. As an example of the effect of the care of animals on man's nature, it is only necessary to cite the great brutality of the mobs of the cities when excited. In the great slaughter in France during the Revolution, Paris was the scene of the most terrible brutality, and the country people, who had suffered most, committed few crimes. Animals have been thus, we may say, of the utmost value in civilizing man.

"Ohio as a live stock state is among the greatest in the Union. Being, as it is, one of the Eastern states, this fact is of particular interest. It is said of one county in Ohio that within its borders are more herds of different kinds of pure bred live stock than any other place in the world. George Rennick, in 1806, drove east and sold a drove of cattle. This marked the beginning of the contest between the farmers of the East and the West. The building of the National road and canals enabled the farmers of Ohio, Kentucky and other near states to compete with the Eastern farmers. These were great days of prosperity. Ohio became an Eastern state, due to railroad extension, and encountered the competition from the great prairie lands. By 1850 the mower, by 1860 the reaper, and by 1880 the self-binder made the possibilities of the middle West the greatest ever seen. Thousands and thousands of acres of rich land, level and fertile and needing no clearing to produce great crops, which the improved ma-

chinery made possible of harvesting. In the last thirty years we have doubled the population, the agricultural products and the farm land area. The wilderness has been changed to a community of homes. We can scarcely comprehend its significance.

"It takes several generations of occupancy of land to bring it to a high state of fertility. English statistics show that in the fifteenth century the average production of wheat in England was six bushels per acre. Now it is thirty bushels. The low yield was due to the communal system of that time. At Cornell University twelve

acres of land produced forty-seven tons of hay. At Pennsylvania College twenty-six loads of timothy hay were produced on six acres. This was due to the use of common sense and domestic animals. The plains of Gaul have raised wheat since the days of Caesar, yet produce twice as much as America's average crop now. In all improvement of the land live stock must play an important part.

"In conclusion I would propose as a motto on old Flemish saying, which is just as true now as ever. It is: 'No grass, no cattle. No cattle, no manure. No manure, no crops.'"

ABOUT CLOVER SEEDING.

Clover seed is away out of sight this year; from \$10 to \$15 per bushel will be the price, and scarce at that. Yet the farmer must sow it or break up his regular rotation—quite a serious thing to do. It will not pay to sow such high priced seed and not get a stand. When shall it be sown, then? This is a question asked by thousands of farmers yearly and one that much advice is given on every year, yet it is a question that cannot be answered with any degree of satisfaction. One man says sow early before the ground thaws out, so the seed will be covered by the freezing and thawing and not start up the first few warm days in March, to be killed by later freezes. Another says sow late or after hard freezing is past and avoid the danger of freezing. Both of these times of sowing may bring a good stand, or both may fail. It all depends upon the season. In

general, however, it may be said that early sowing in this latitude is the safer, but farther south not so successful. Heavy rains may wash the seed into gullies, or it may be buried too deeply to come up. Again, in spite of being covered, it may sprout and the next cold night kill it.

The only rational way of sowing clover is to make two sowings—one early and one late sowing, half the seed each time. If we use six quarts per acre, sow three early and three late. If either sowing fails, the other will make a fair stand, and if both catch you can't have it too thick. You can't depend upon the season, and it will certainly pay for the extra work of sowing twice if a stand is assured. It doesn't take long to sow clover seed. Better make two sowings. The only man I know who never fails to get a good stand of clover always makes two sowings. He always has clover.

THE PRODUCTION OF POWER AND LIGHT FROM FARM PRODUCTS.

Professor A. G. McCall.

Geologists and minerologists tell us that our supply of mineral fuels—coal, oil and gas—can last but a few generations at most. Forestry experts are agreed that our fuel supply in this direction is limited and that our land cannot be reforested rapidly enough to supply the world's demand for fuel or heating and power purposes. It is not strange, therefore, that our engineers are already looking about for other sources of heat and power.

At the present time there seems to be at least three sources of heat and power which give promise of great possibilities in their future development. These three sources are (1) water-power through electrical transmission; (2) the direct rays of the sun converted into heat and power, and (3) the products of the farm converted into alcohol and used in this form as a source of heat and power.

It is the purpose of this article to consider the subject only from the standpoint of the utilization of the products of the farm for the production of alcohol.

We must look to the engineer and to the physicist for results along the two lines first suggested, but the production of alcohol for industrial purposes is more distinctly an agricultural than an engineering problem.

Until quite recently the heavy government tax upon alcohol has made its use for industrial purposes prohibitive on account of its high cost.

In June, 1906, however, Congress passed an act providing for the sale of alcohol for industrial purposes without

the payment of the tax, provided it had been rendered unfit for use as a beverage or as a medicine by mixture with some denaturing material. This act does not change in any manner the conditions under which alcohol may be manufactured, but simply provides that alcohol may be withdrawn from bond free of tax provided it is denatured after it is so withdrawn. Subsequent changes in the internal revenue laws have made it possible for the farmer to set up and operate a still on his farm by complying with certain regulations, under government supervision. However, the function of the farmer will probably consist in the production of the raw materials from which the alcohol is to be made rather than the manufacture of the alcohol itself, as its production on a small scale is not likely to prove profitable.

The raw materials from which alcohol is made consist of those crops grown upon the farm which contain sugar, starch, gum and cellulose, capable of being easily converted into a fermentable sugar. This material is mashed, fermented and then subjected to distillation.

The chief alcohol yielding material produced in farm crops is starch; second in importance is sugar, and the least important is cellulose or woody fiber.

Of the crops grown extensively in the United States corn and potatoes are the most promising for the economic production of alcohol, the former producing the most of the alcohol now manufactured in this country.

About 70 per cent. of the total weight of a bushel of shelled corn is fermentable material. The weight of the alcohol produced under favorable conditions will be a little less than half that of the fermentable matter. Therefore, the weight of 95 per cent. alcohol produced by a bushel of corn of average composition would be about nineteen pounds or about two and three-fourths gallons. With corn selling at 40 cents per bushel the cost of the raw material for the production of a gallon of alcohol is about 15 cents, to which must be added an equal amount for the cost of manufacture. This brings the total cost of 95 per cent. alcohol to the manufacturer up to 30 cents per gallon when it is made from corn at present prices.

The fermentable matter in potatoes grown in the United States is about 20 per cent. of the total weight, or twelve pounds. The alcohol produced per bushel of potatoes is, therefore, about six pounds or three and one-half quarts. The amount of alcohol produced by a bushel of potatoes being only about one-third of the amount

yielded by the same quantity of corn, it follows that, in order to compete with corn, potatoes, for the production of alcohol, must be grown at about one-third the cost of corn, which is not possible under present conditions.

When we recall that it requires approximately one and one-fourth gallons of alcohol to equal in fuel value one gallon of gasolen, it is evident that under present conditions alcohol cannot compete with gasolene in the production of power.

By cheapening the cost of raising starch and sugar producing crops and by the utilization of waste products of the farm and canning factories, the present cost of producing alcohol for industrial purposes can be materially reduced. With the steady advance in the price of gasolen with the increased consumption, it is not unreasonable to believe, therefore, that the time will come when alcohol will compare favorably with gasolen in the cost of producing power and light.

Agronomy Department, O. S. U.
February, 1908.



Why Farming Sometimes Does Not Pay.

CULTIVATION OF MUSHROOMS.

By G. W. Hood,

Florist, Botanical Greenhouse, O. S. U.

The cultivation of mushrooms is, as many people already know, very doubtful and uncertain. The failure may be attributed to several causes, among which the following may be mentioned: Lack of care, poor spawns, improper watering, uneven temperature and bad compost.

A mushroom, as the term is generally understood, is a fruiting body of a fungus and consists of the following parts: First, the cap or pileus, which is the expanded part; second, the gills, which are located on the underside of the cap and in which the spores are found; third, the stip or stem; fourth, the veil, and fifth, the volva or sack, found at the base, usually just under the surface of the ground. Some genera of mushrooms may have both veil and volva; others may have either one or the other, and some have neither. The genus *Agarcus* has the veil, but lacks the volva, while the genus *Amanita* has both veil and volva. The species in the genus *Amanita*, most of which are exceedingly poisonous, can be distinguished by the fact that they have both veil and volva. Hence, a species with both veil and volva should not be used for food unless positively known to be edible.

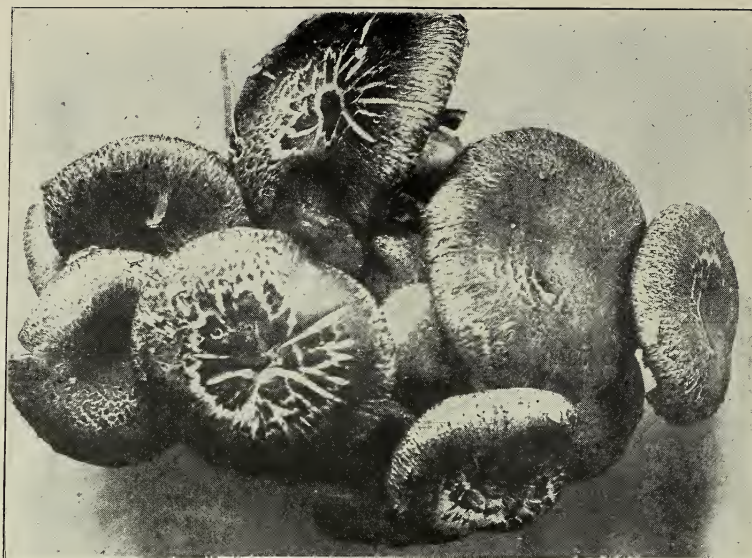
Mushrooms can be grown in a number of places, as, for instance, in cellars, caves or specially constructed houses, where the right temperature can be maintained and a proper amount of moisture secured.

Some species of the genus *Agarcus*, chiefly *Agarcus campestris*, *Agarcus arvensis* and *Agarcus villaticus*, lend themselves best to cultivation. Each

of these species is divided into races or classes, so to speak, each having a popular name. For instance, *Agarcus campestris* is divided into five or six different types, the color of the cap suggesting a name, as, the Dark Brown Bohemia, the color of the cap being a dark brown; the Light Brown Bohemia, the color of the cap a lighter brown; Cream White, in which case the cap is of a creamy white color. *Agarcus campestris* is, without a doubt, the most widely cultivated, the finest flavored and most delicate of mushrooms. *Agarcus arvensis* and *Agarcus villaticus* are a little larger types and much coarser, and the demand for these species is not so great as for the more delicate *campestris*. Some races of the different species thrive best under certain conditions and have been obtained chiefly by selection.

Preparation of the compost is one of the most important and essential requisites to the successful growing of mushrooms. It must not be understood that there is one way and only one way of preparing the compost. The conditions vary with every locality and season of the year.

The manure, which is preferably fresh horse manure, must not be over ten or fifteen days old and should not be burned or fire-fanged. The manure is piled up in compost heaps, which may be of any convenient size. A layer of manure one and one-half to two inches is spread out and firmly tramped down. Enough water is then added to make it moist, but not wet. A second layer is added and treated as the



Agar'icus campe's'-tris, Dark Brown Bohemia. Cluster weighing $2\frac{1}{4}$ lbs. $\frac{1}{2}$ natural size.

first. Other layers are added in the same manner until the pile is completed. Great care must be exercised in getting the proper amount of water, and if the manure is piled out of doors it should be covered up with straw or some other material so as to keep any rain from soaking the manure.

Some growers insist that all the straw should be shaken out of the manure, but I find that I have had just as good results with a reasonable amount of straw in the manure as I had when I took it all out, and I do not think the advantages gained by the use of pure manure warrant the extra work of removing all the straw. After a day or so, on examining the pile you will find that it is very warm or even hot in the interior, due to the rapid oxidizing action of bacteria and probably of independent ferments. The bacteria as well as the excessive heat prove detrimental to the growing mycelium. About this time the compost pile should be forked over into another pile and allowed to cool off, and perhaps be watered some. It will again

get very warm, running up as high as 150 degrees F. The forking over should be continued from time to time, all the fire-fanged manure being thrown out and the dry places sprinkled with water. In from two or three weeks the pile will begin to fall in temperature, and by this time all the odor should be gone and the straw should be a dark brown color, very brittle and greasy to the touch. If care has been exercised in watering, it will also be moist enough and in proper condition to be placed into the beds.

In installing the beds it is deemed advisable to exercise the utmost care in seeing that the manure is well placed and tramped. If the beds are to be flat, a layer of manure should be placed on the ground and tramped well, and at the same time if the compost is not moist enough some water may be sprinkled on the manure. Continue placing layer after layer, each being well tramped, until the bed has reached a depth of eight or ten inches. There is, however, some dispute as to just what depth the manure should be

placed. I have had some success with beds five or six inches deep, but I think for commercial purposes it is best to have them at least eight or ten inches in depth. If the floor space available is not sufficient, beds may be arranged in tiers or shelves along the sides of the walls, thus enabling one to secure much more bedding space. The shelves or tiers should be placed about two or three feet apart, and the compost in the beds should slant from the wall down at an angle of about 5 degrees. Some growers prefer the ridge bed, which is made in the form of a ridge, as the name indicates, the base being about two or three feet wide and tapering to the top. In this form of bed the manure should also be well tramped and somewhat deeper, probably fifteen to eighteen inches through the center. Ridge beds enable one to

get a greater surface space in a given area, but are more expensive as far as construction is concerned. In either case the beds are not ready to receive the spawn as soon as they are made. After the compost is placed in the beds a second fermentation takes place, and the temperature will rise as high as 90 or 100 degrees F. In a few weeks the temperature of the bed again falls, and when it is the same as the temperature of the cellar the spawn should be inserted.

Temperature and moisture, both in the compost and cellar, are important factors. Great care must be taken not to get the compost too wet, because then there is danger of the mycelium "damping off," and, again, it must not be too dry, or the mycelial threads will refuse to grow. The following test I have found the safest and most re-



A-gar'-i-cus cam-pes'-tris, Light Brown Bohemia, showing gills and veil. Natural size.

liable: Take a portion of the compost in the hand and squeeze it firmly. If moisture conditions are proper, a small amount of liquid will appear between the fingers. The temperature of the compost should not be over 70 or 75 degrees F. when the spawn is inserted. It then gradually falls down to 60 degrees, where it may remain for six to eight weeks. The cellar or room in which the mushrooms are raised should have a damp, moist atmosphere, and the air should not be allowed to become warm and dry. The temperature of the cellar should be kept between 55 and 60 degrees F. for the best results. When a high temperature is maintained, you force the mycelium to grow too fast, and it thus produces small, weak mushrooms, or, in other words, the vitality of the mycelium is reduced and cannot produce as fine fruit as when it is allowed to get a good root system, so to speak, or a great number of hyphae.

When your beds have reached the required temperature, you now insert the spawn. If the English or brick form is used, the brick may be cut into pieces of convenient size, say about $1\frac{1}{2}$ by 2 inches, and placed 10 by 12 inches apart, the rows being a foot apart and the pieces ten inches apart in the rows. After the spawn is all in the entire bed should be well firmed again.

In from a week to ten days after the spawn has been placed in the beds you then case it. Casing means the placing of a good garden loam, or, perhaps better, a soil containing some little clay or a clay loam over the manure, and tramping it well. By using a clay loam, which is more retentive of water, you do not have to water so often. The less you water after the mushroom appears, the better caps you will have. Care should be taken to keep the soil

from drying out, to prevent which it can be mulched with straw or covered with gunny sacks.

Watering after the mushrooms have appeared is a very tedious undertaking. If the beds have been mulched or covered up, probably the best way is to use a fine spray, wetting both the walls and the beds. It is better to water well and less often than to give just a little sprinkle each day. In case the beds are not covered up, flooding, then, is probably the best. This consists in allowing the water to run over very slowly until it covers the entire bed, so as not to wet the caps any more than possible. Always water after the mushrooms have been gathered; never before.

In picking the mushrooms you should grasp the cap with the thumb and first and second finger, giving it a slight twist, which breaks the stalk loose from the mycelium. By doing this you take the entire stem out, thus avoiding any decaying of the old stipe, which serves a fit medium for fungous diseases to thrive in. If they are intended for market, they should be graded and of a uniform size and color.

After the mushrooms have stopped coming up in quantity and the beds cease to be a source of income, you should waste no time in thinking more will appear, but tear out the entire beds and install new ones. You might get a few stray ones for quite a while, but not enough to be any benefit, and time is lost in waiting for them. So, in the long run, you make more by throwing out the old beds and putting in new ones than by waiting for the scanty supply you will receive from the old beds.

Mushrooms, like almost all fruits, are not without their enemies. They

are troubled both with insects and fungous diseases. A few species of Coleoptera attack the cap and stem, thus destroying them. These beetles are small brown insects living inside the stem and between the gills, sometimes devouring the entire plant. A disease known as "fogging off" sometimes at-

tacks the button stage and causes them to turn brown, cease to grow and soon decay. This is, however, supposed to be a physiological trouble—that is, one caused by lack of essential conditions. It is also thought by some that molds and bacteria play an important role in producing this disease.

SOILING CROPS.

H. E. Evans, '09.

Soiling crops are those which are sown from time to time, to be harvested while yet green and fed in the pasture, feed lot or stable. Corn cut and fed to animals at any stage prior to maturity furnishes an illustration of such a crop. A soiling food is therefore another name for a green food.

The subject of soiling crops is receiving considerable attention in the state at the present time. This is due largely to the fact that the feeding of fat cattle is becoming less profitable and is being supplanted by the more profitable dairy business.

It is no longer a question of dispute as to whether or not soiling is a profitable proposition under ordinary conditions. The production of green crops as an amendment or substitute for pasture is essential to the highest success in dairying and is to some extent desirable in other branches of stock feeding. This has been proven by a large number of experiments at various agricultural colleges throughout the country. Whether soiling should be substituted entirely for grazing is a matter that should be decided according to the conditions involved.

The practice of complete soiling is chiefly adapted to an intensive cultivation. This is the form of soiling practiced near large cities, where land is

scarce and high, and from which it is necessary to secure a maximum yield while they are being tilled. The general adoption of this form of soiling in this state, where land is relatively cheap, is probably remote rather than near.

Partial soiling means supplementing the pasture with green food for a part of the season, as occasion may require. Such food may be given once a day or oftener, according to the needs of the animals. The chief object in partial soiling is to keep the animals well supplied with palatable and nutritious food when the pasture is inadequate. Where milk supply is involved, it aims to furnish succulent food after the grass has lost much of its succulence. Partial soiling is best adapted to a system of farming midway between the intensive and extensive. It is this system that should appeal most strongly to the average dairy farmers of Ohio.

The following are some of the more important benefits to be derived from the soiling system: 1. It saves land. 2. A saving in fencing is effected. 3. There is less waste in feeding. 4. A saving of fertility is effected. 5. Such a system keeps animals in better form.

Growing soiling crops affects a great saving in land, as it enables the farmer to raise much more food from a given

area. It has been estimated from various observations that from three to five times as many animals can be supported on a given area by soiling as by grazing. Professor Ormsby found that two soiling crops in one season (rye, followed by corn) yielded five times as much digestible organic matter as pasture sod when the whole growth of the latter was saved without waste.

Growing soiling foods lessens the necessity for building fences on farms where live stock are kept. The saving affected is proportional to the number of animals kept, the cost of labor and materials for fencing. With the present high price of materials the saving would be considerable. The outlay for fencing must be repeated every few years, to say nothing of the sums paid out from year to year for repairs.

There is less waste when crops are fed under the soiling system than when pastured or fed in the matured form. This saving is effected first in the saving through tramping, as compared with pasture grass; second, in the absence of loss in harvesting, as compared with matured crops, and, third, in the more complete consumption of the food.

The soiling system affects a great saving in fertility, since more and better manure can be made than by the pasturing system. More manure is made because the animals are at all times on full feed and because by the soiling system more animals can be sustained on a given area. The manure is likely to be more valuable, since, along with the soiling feeds, greater quantities of meal, rich in the elements of plant food, are often fed.

By the aid of soiling crops domestic animals can be kept in better form than without it. With such aid animals can be kept in more even condi-

tion and the animal energy better preserved. The succulence of the foods usually exercises a wholesome influence on the health of the stock. The waste that arises from the exertion of the animals in gathering food is lessened.

To the soiling system there are some objections. Chief among these are the following: 1. It involves increased outlay for labor. 2. It is not always easy to adjust the food supplies to the need of the animals. 3. It may in some instances tend to impair the stamina of the stock.

The soiling system in either form cannot be adopted without considerable increase in labor for those who care for the stock. The complete system, however, involves a great deal more labor than the partial system. The increase of labor arises from the necessity of cutting the food daily or at intervals of not more than two or three days. The caring for the animals from day to day also makes extra work.

Complete soiling calls for the exercise of much thought in securing food supplies and in adjusting them to the needs of the animals. There must be a succession of feeds. No food is at its best for soiling purposes for many weeks in succession. There must be variety of foods thus grown in succession. A supply of these foods must always be on hand through sunshine and storm. To properly adjust these matters is no easy task.

While the soiling system tends to promote good health in stock, it may be so conducted as to injure the stamina in the animals subjected to its conditions. Up to a certain limit utility in live stock is improved by artificial conditions. Beyond this limit stamina is weakened. Unnecessary exertion lessens production. Insufficient exer-

tion lessens stamina. History and experience point to increased mortality among animals and also among men in proportion as they are surrounded by conditions of much restraint. The danger of undue restraint does not apply to animals subjected to the conditions which partial soiling imposes.

In selecting soiling crops the farmer must be guided by the kind of animals to be fed, the nature of his soil and the time the crops will be needed. If soiling is adopted to supplement the pasture during the summer and early fall, as already stated, it would be most profitable in this state. A limited number of crops will meet the demand. Three sowings of Canada peas and oats in late May or early June and two plantings of corn, one at the usual time and one two weeks later, would furnish a supply of green food when most likely to be needed. Where complete soiling is practiced, a greater number of crops must be used. Some of the more common crops used are winter rye, winter

wheat, crimson clover, oats, corn, millet, Canada peas, soy beans and barley. The number of crops and time of sowing depends, as in the partial soiling, on the soil, climate and kind of animals to be fed.

The area to be devoted to soiling crops depends on the number of animals and the productiveness of the land. Various estimates have been made as to the needed area of soiling crops to supply a given number of animals a certain length of time. One authority states that seven acres devoted to a succession of soiling crops will supply twenty-five cows from May 1 to November 1. Other writers estimate the required area of soiling crops as from one-fourth to one-half a square rod per day for each full grown animal, the smaller area applying to corn and the larger to oats, peas and other similar crops. Of course, all this is a matter of judgment, depending largely upon the circumstances involved.



A Fair Valley.

THE FUTURE OF AGRICULTURE.

H. E. Tweed.

Even now we are not greatly removed in the point of time from a period in which agriculture was as different from today as the ancient stage coach as a means of transportation was different from the palace car of the present. When we think of the many comparatively adverse conditions that surrounded the pioneer farmer of our land, and the way in which he so patiently and bravely wrought out his career amidst hardships and privation, we cannot fail to admire—yes, to reverence his work, for it was this that laid the foundation for the present era of almost unbounded achievement. Now that it is given the present generation to so richly enjoy the benefit of all past effort, it is but well and to say the least interesting, to make some deductions as to what the future may hold in store for us, and for those who are to follow.

All deductions as to the future must needs be somewhat speculative, but the observer may see some things which may be taken to indicate conditions not yet materialized. It is well to remember at the outset that agriculture is not going to stand still for a moment. Boasted and comparatively perfect as the situation now is, it only seems thus, for the momentum of progress, greater than ever before, is destined to carry us upward and onward until the close of the present century will witness accomplishments which compared with the greater efforts of the present day will mark us a generation of mere agricultural pigmies. The physical must continue to yield to the mechanical, the rude to the scientific, the unskilled to the skilled—

greater and far more effectual order will come out of what is yet to some extent chaos and disorder. The power of accomplishment of the individual will thus become greater and greater as new inventions and methods are evolved.

We observe that the agricultural life of the future will continue to be a comparatively pure life, and that for this reason the world will continue to look to the farm for nearly all of its leaders. Thriving upon the gregarious instinct of man, the cities and many hamlets will become larger and more densely populous and in the same proportions the vice and debauchery therein will increase. This and the fact that the average moral status of those who leave the farm for the city is such that the general average of those remaining on the farm is improved, together with the contaminating influence of the constant influx of foreigners nearly all of whom remain in and about the cities, seems to pretty clearly define the future of the city, and to show the comparative purity of the rural districts.

A tendency of the present and one that will in all probability extend far into the future is that of our population to abandon the farm and take up other vocations. This generally misguided populace goes to the mines, mills, factories, railroads, etc., with their death-dealing dangers and unhealthy conditions, there to be numbered and uniformed as the property of some corporation. Steady drudgery, few holidays, little room for promotion, conditions rarely such as to enable them to provide for declining

years, this large and comparatively un-American class will continue to be recruited largely from the farm. Let us see for a moment what the probable effect will be. It might seem that the depleted ranks of those who remain on the farm would suffer, and such has been true to some extent. Already, however, it is evident that the future will take care of itself in the matter. Fewer producers and more consumers means better prices and much better demand for farm products. It only remains for those on the farm to bring to bear every means of economical labor and management, of increasing the productive power of the individual and the farm that those in the other vocations may be fed and clothed at remunerative prices. Within the past ten years more than four hundred people have left a single rural county in Ohio to engage in other vocations. Let them go—and stay! not returning at the approach of financial stringency. Let them remain where we may continue to enjoy their patronage as consumers.

Time will further enlighten the generality of our people in the matter of marketing their products and of purchasing the necessities of life. What through education, what through increased shipping and selling facilities and what through organization, they will see the importance of eliminating all designing and unnecessary middle men who now prey largely upon the ignorance of their patrons. They will learn to get closer to the consumer, selling their produce at the great trade centers and in turn purchasing their necessities at the same place. Then the honk of the country huckster and the dingy stock of shoddy wares now kept by the country merchant will be no more. The local tradesman is already showing his hand in opposition

to the various movements that show him what the future has in store for him. He long fought rural free delivery of mail, but had to yield to the overwhelming demand of agriculture. Just as sure will he be compelled to yield to the demand for a parcels post and postal currency, which, together with more good things to follow, make his future outlook all but encouraging.

The future will see great changes in the matter of live stock, farm methods, crops, etc. The scrubs that are now found in nearly every section must disappear and instead our fields will be trodden by animals of superior lineage. And there will come a knowledge of sectional adaptability now so little recognized. It is probable that our comparatively steep lands, unless wholly depleted by cultivation, will be rightfully devoted to pasturage, while areas adapted to cultivation will be farmed by intensified methods and both will be augmented and perfected by future discoveries. Antiquated methods, still in vogue in all sections, must yield to the light of enlightened experience. The tendency to specialize will rapidly increase, thus following the examples of the professions.

And we note that the future will witness an organized agriculture. Out of the now scattered ranks will come order and union, until it will need but the word of command which when sounded along the line, will be heard and obeyed by those in authority. The powers that now dictate prices upon the farmers' products, etc., will be a thing of the past. The manufacturer and dealer may continue to set the price upon their products and the farmer will attain his rightful power of exercising a like privilege. If our corporations are to continue their aggressive methods of business, the farmer,

too, will of necessity combine with his neighbor that they together may enjoy similar advantages.

If the deduction made elsewhere is true, that agriculture will not stand still, we must either advance or retrograde in all matters, including management and methods. To the latter the free American spirit will never consent, for in so doing we would be drifting toward an ultimate condition of tenantry, similar to that which now exists in the old world. At present our system of tenancy is one of the most depleting influences of American agriculture. Ascribing this largely to the customary yearly lease it would seem that the long time lease system of Europe would bring better results, for then the tenant would be interested in maintaining to some extent, at least, the productiveness of his lease. We do not, however, expect the future to bring any considerable tendency toward such a solution of the matter. Instead, we think it probable that the tenant will by education and other influences generally more favorable than at present and the many advantages he already enjoys in connection with his generally enterprising disposition become more often the possessor of the land he tills. One thing would do much to bring about such a condition, and that is the repulsion of the present unfair method of taxing, not alone the land, but the obligation thereon as well. If the latter were remitted, it would then be possible for the tenant who is ambitious to own a farm to secure loans at much lower rates, and his incentive to purchase would be much greater.

It is evident from that which is said above that the future will witness an educated agriculture, and, in fact, it is largely through this channel that all

advancement must be made. It is disgusting to note that we have so long failed to have the rudiments of agriculture taught in our common schools, and that even yet no considerable effort is being made in that direction. We have but to look about us to see on nearly every hand the sad lack of foresight in agricultural matters. Evidently we have robbed not alone the soil of its fertility, but the mines of their products, the waters of their finny inhabitants and the forests of their invaluable resources. It is noteworthy that only a few decades ago many of our eminent educators thought agricultural education altogether unnecessary, one authority referring to the same as "mere gab." At present, however, the indications in this direction are more hopeful. Yet, in Ohio, less than 4 per cent. of those who are coming into possession of farms are receiving anything like special training. In the United States we have sixty-five agricultural colleges, with something like 11,000 students. This, however, is comparatively encouraging, as it is a larger number than at any previous time. The influence for better farming that is coming from the above and other sources, including books, periodicals, bulletins, etc., is sure to steadily increase as the years go by, until the advent of another century will witness an agriculture worthy of the attention and admiration of all mankind. It is true that many good farmers have lived in past years, but owing to the lack of suitable methods of communication the result of their investigation ceased with their existence. It is not so now, for our educators and other practical investigators, employed and aided by the state, nation and enterprising private publishers, are constantly putting the results of experience and investigation into such permanent form that it will become a valuable asset to future generations.

COMMERCIAL OUTLOOK FOR FRUIT IN GENERAL.

L. M. Oyler, '09.

The development of fruit growing as a business distinct from the general operations of the farm has been one of the striking changes in American agriculture during the past fifty years. Early in the last century commercial orcharding was unknown in the United States. Apples and other fruits were grown in a small way about the home for family use, but very little fruit was put upon the market in a commercial way. As the country grew and the facilities for transportation were extended and improved, fruit growing quickly assumed a commercial aspect, and in the last thirty years it has developed into one of the leading agricultural industries of the nation.

This rapid growth of American pomology has accompanied the rising standard of life, which has led to the freer use of fruit as a staple article of food throughout the world. There is now a network of railroads over the country, and with the modern steamships, have made commercial fruit growing possible by bringing the fertile lands of the Mississippi Valley and of the Pacific Coast nearer in point of time to the eastern states, and to Europe, than the orchards of Michigan and Western New York formerly were to the cities of Boston, New York and Philadelphia, while the recent development of the cold storage warehouse business is adding stability and permanency to the industry by equalizing the supply and demand of fruits, especially of the apple, by storing up the temporary over-supplies at the harvesting period and distributing them at home and abroad as needed.

The fruit trade is subject to violent fluctuations in supply and demand on account of the perishable nature of the product. The glutted markets which have often characterized fruit trade at the height of the shipping season are due to inadequate facilities for the wide and rapid distribution of the fruit. They are the result of a condition of the industry which has made it necessary to force the crop on the market within a short space of time. These gluts are not caused by a general over-production of fruit, but rather by the faulty distribution of the crops, as an equal quantity of fruit would not supply the demand if it were distributed more widely and uniformly throughout the year.

In the older industries there is a system of warehouses in which the temporary surplus products are stored at harvest time and from which they are distributed to domestic and foreign markets when production ceases and the demand increases. Thus the commercial fruit grower can find a sale for his crop at a fair price, even if he can not get his crop on the immediate market.

The citrus fruit business of California is a striking industry that has grown up within thirty years. The first carload of three hundred boxes of oranges is said to have been shipped from that state in 1876. The shipments reached one thousand cars ten years later, in 1886. A decade afterwards, in 1896, nearly sixteen thousand cars were forwarded, while about thirty thousand carloads of oranges and

(Continued on page 21.)

THE AGRICULTURAL STUDENT

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MARCH

DEATH OF HAROLD E. WOODS.

We mourn the death of one of our esteemed fellow students, Harold E. Woods, who died February 18, at the Protestant Hospital. Mr. Woods had been unwell for some time, and was about to give up his school work when dread typhoid pneumonia set in. Mr. Woods fought hard, and it was thought he would recover, but other complications setting in proved fatal.

Mr. Woods was an exemplary young man, and a conscientious worker in college. He made many friends among students and faculty, who all regret most sincerely that such a promising career should be blighted when just ready to start his life work.

Mr. Woods was President of the Agricultural Society, a member of the Y. M. C. A. Cabinet, and actively connected with other organizations. He was a member of the Delta Theta Sigma Fraternity.

We extend to Mr. Woods' bereaved parents our deepest sympathy, and share with them the great grief which they feel.

"What will I do after finishing my college course?" is a question many young men are thinking about very seriously as the end of their last year in college looms up not so very far distant. Whether to return to the farm, take up teaching, station or govern-

ment work, is the question to decide, and, in fact, is no easy one. For a large number of men the former course presents great difficulties. While farming is the occupation most to their taste and one in which they hope to spend the greater part of their lives, the fact that to begin farming takes considerable capital proves an effective barrier. They have no farm and no capital. Will it pay them to rent a farm and borrow money to start in business or to try to buy a farm? Another large number have the opportunity to return to the home farm and take part of the burden from older and weary shoulders. Another smaller number have farms provided by parents in readiness to go to when they choose. For the latter class the question is not so serious a one, yet even among these many are in doubt as to whether it would not be better for them to teach or engage in other work for a time in order to get more experience and better judgment.

The great desire is not that these young men should settle down to farming at once, but that they should plan to make farming their ultimate occupation. The danger is that, once started in other occupations, the desire to be tillers of the soil may be lost and thus the object for which the state is training these young men—viz, to become leaders in agricultural work—will be largely lost. The graduate from an agricultural college should be a farmer, he should put in actual practice his teachings and show by actual work that agriculture can be made the greatest occupation in the world. The country needs such men, and the opportunities for success are great. Then let the man with the opportunity start in his work as soon as possible. Let him determine that his work shall be

an example of thoroughness to his community. His field will be wide enough to satisfy all desires.

For those men who must engage in other occupations for some years, let them chose that work which will keep them in touch with agriculture. Let them resolve to be farmers as soon as circumstances will permit, and let them keep this resolve. We owe it to ourselves, to the state and to our community.

ALUMNI NEWS.

'06. T. B. Foster was a visitor at the University recently. He is located on a farm near Cincinnati.

'07. E. J. Kitchen was at the University during the week of the State Breeders' meetings and State Dairy-men's meetings.

'04. A. S. Neale attended the meetings of the Live Stock and Dairymen's Associations. Mr. Neale is farming near Macedonia, Ohio.

'07. F. D. Heckathorn is working for the State Board of Agriculture as assistant orchard and nursery inspector.

'05. W. A. Martin stopped in Columbus and visited the University recently while on his way to talk at a Clark county farmers' institute.

'05. E. S. Poston spent a few days among friends and visited the University recently. Mr. Poston is a farmer near Logan, Ohio.

'06. Garfield J. Wilder was here during the Dairymen's meeting. He looks well and prosperous. Mr. Wilder is manager of a large farm near Cleveland.

son of 1904-5, the fruit reaching every town of importance in the United States and Canada, as well as to many foreign market. The deciduous fruit industry has also shown a remarkable development. The western coast has not been alone in the rapid development of commercial fruit growing. The crops of the southern and eastern states have kept pace with the western states.

It is nearly a general principle that the commercial outlook is best in those fruits which readily yield themselves to the greatest number of manufactured products. In these fruits the grower is not dependent upon a single outlet. When there has been an exceptionally good crop, the grower should use care in sorting and packing and ship only the best grades. In nearly every instance more clear profit will be realized than if the whole crop unassorted had been shipped.

A few years ago fruit was a luxury; today it is an every-day commodity. People have come to realize the dietetic value of fruit. The supply of fruit, if distributed to all points where fruit is wanted, would never be greater than the demand. By means of the railroad the farmer can place his crop on a distant or even on a foreign market and compete with the fruit growers of that locality or country. A general knowledge of fruit trees and their requirements for growth and bearing are becoming better understood every year. Any one who will adopt scientific methods of fruit growing, no difference what kind of fruit, can make a success of it in a commercial way, as well as plenty of enjoyment derived from living close to nature.

COMMERCIAL OUTLOOK FOR FRUITS IN GENERAL.

(Continued from page 19.)

lemons, valued in California at \$27,000,000, were shipped during the sea-

STUDENT DAYS

Are just the time to investigate the merits of advanced farm machinery.

You know the kind now being used at home can be improved upon!

Your college experience will teach you the great advantages of improved dairying machinery and above all the merits of the cream separator.

Your Opinion

Will be appreciated at home and looked up to.

So investigate the merits of our

NEW IOWA Cream Separator

It has several different features that cannot be found in any other cream separator.

For instance our new self-centering neck bearing! unsurpassed in simplicity, durability and effectiveness. Our new throwing out of gear device, situated where it saves two thirds of the wear on the machine, is the most remarkable separator improvement this year.

Our low form of construction, placing all the working parts low in the machine, insures it much longer life than is possible with any other cream separator.

It's dust proof gearing; two core bowl, giving it the most remarkable skimming device on earth; easy cleaning; easy running; all contribute toward making the New Iowa the best cream separator to buy.

The perfect construction of the machine and the splendidly equipped factory that builds it, largest in the world, make an invincible argument for every farmer owning a New Iowa.

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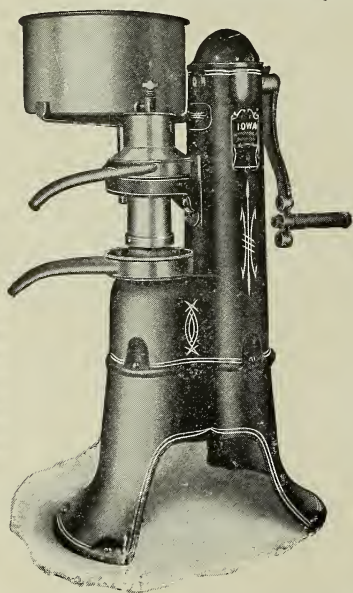
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Live Stock Feeders and Shippers

Anything that affects a man's pocketbook touches him in a vital spot, hence if you are a feeder or shipper of live stock the selection of a commission firm to handle your consignments ought to be a pretty interesting subject to you.

Are you sure that you are getting the very best service in the handling of your live stock? Anyone can sell live stock, but only a very few of the best and highest-paid salesmen in the business have that broad and intimate knowledge of men and market, that inborn talent for trading, that count so heavily in the shipper's favor.

Those that are so equipped stand at the head of their profession, and are the sort of salesmen which compose our staff. They know how to get "the last nickel"—and **IT'S THE LAST NICKEL THAT COUNTS.**

R. B. Wyatt, Reserve, Kansas, writes our Kansas City house: "I want to thank you for the interest you took in selling my yearlings. You certainly worked hard to get that other nickel, and I am well pleased and appreciate same."

W. B. Widman, Bigelow, Minn., writes our Sioux City house: "Your sale of car of hogs made for me was very satisfactory. They were well sold considering the condition of the market. I hope some time to have more stock for you to sell for me. I know you are very competent to get good returns for all hogs I may ship to you."

F. W. Merrill, Kaneville, Ill., writes: "I am well pleased with your sale of my cattle. They were on feed only ninety days and gave me a margin of \$1.85 per cwt. I consider them well bought and well sold and shall consign my next shipment to Clay, Robinson & Co."

Lonnie Rummel, Swanington, Indiana, writes: "I am this morning in receipt of the load of lambs you bought for me and am well pleased with them. They surely are a good lot."

B. B. Baker, Monticello, Indiana, writes: "I wish to thank you for the last two cars of feeding sheep you sent me. They were exactly what I wanted. I think this last lot made you some customers in this vicinity as two parties have promised me to order from you."

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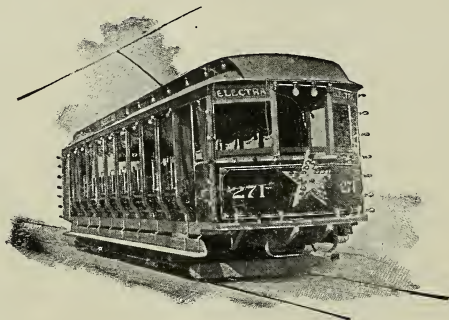
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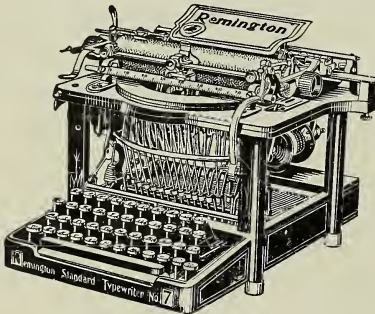
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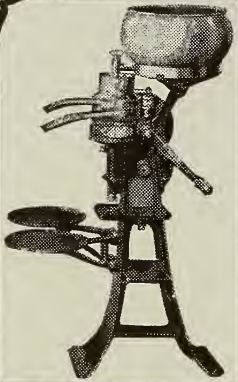
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